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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matters of	)	
	)	
Federal-State Joint Board on Universal Service;	)	CC Docket No. 96-45
	)	
	)	
Forward-Looking Mechanism for High Cost Support for Non-Rural LECs	)	CC Docket No. 97-160

REPLY COMMENTS OF BELLSOUTH CORPORATION, QWEST COMMUNICATIONS INC., AND SPRINT CORPORATION

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BellSouth Corporation ("BellSouth"), Qwest Communications Inc. ("Qwest"), and Sprint Corporation ("Sprint"), collectively the "Joint Commenters," hereby submit their Reply Comments in response to the Comments filed by AT&T Corp. ("AT&T") and WorldCom, Inc. ("WorldCom") regarding changes to the Synthesis Model ("cost model" or "model").

I. INTRODUCTION AND SUMMARY

In their initial Comments, the Joint Commenters expressed support for the conversion of the Turbo-Pascal portions of the model to a more modern programming language, but asserted that conversion to Visual Basic, rather than Delphi, would better meet the Federal Communications Commission's ("Commission") objectives. In addition, the Joint Commenters identified three errors in the current model that should be corrected before the model is used to determine high cost support amounts for 2002.[1]

In contrast, AT&T and WorldCom propose numerous changes to the model, many of which would constitute fundamental modifications in the manner in which the model estimates

[1] Comments of BellSouth Corporation, Qwest Communications Inc., and Sprint Corporation, filed Aug. 13, 2001 ("Joint Comments").

cost. Moreover, most of the "corrections" advocated by AT&T mirror positions that the Commission rejected in the *Tenth Report and Order*.[2] The Joint Commenters do not object to the Commission considering certain of the changes proposed by AT&T and WorldCom that appear, at least in theory, to improve the accuracy of the model. The Commission should reject most of the changes proposed by AT&T and WorldCom, however, because they are beyond the scope of the present inquiry, essentially constitute attempts to reargue decisions in the *Tenth Report and Order*, and otherwise are not warranted.

II. THE JOINT COMMENTERS DO NOT OPPOSE THE COMMISSION'S CONSIDERATION OF CERTAIN CHANGES PROPOSED BY AT&T AND WORLDCOM

AT&T proposes several changes to the model that it describes as "implementation improvements."[3] WorldCom suggests a number of the same changes. At least in theory, some of these changes may be valid corrections to the model. In particular, the Joint Commenters do not object in concept to investigation of the proposed changes regarding the placement of the drop terminal,[4] the sizing and configuration of lots,[5] the sizing of outside plant equipment,[6] and the elimination of inconsistencies in the model's expense modules.[7] The Joint Commenters have not sufficiently analyzed the Turbo-Pascal computer code submitted by AT&T and WorldCom to verify that it accurately implements the changes proposed and does not cause any unintended

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[2] *In the Matter of Federal-State Joint Board on Universal Service; Forward-Looking Mechanism for High Cost Support for Non-Rural LECs, Tenth Report and Order*, 14 FCC Rcd. 20156, 20173 ¶ 36 (1999), *aff'd sub nom., Qwest Corp. v. FCC*, No. 99-9546 (10th Cir. Jul. 31, 2001) ("*Tenth Report and Order*").

[3] AT&T Comments, filed Aug. 13, 2001 at 2-8.

[4] AT&T Comments at 3; WorldCom Comments, filed Aug. 13, 2001 at 2.

[5] AT&T Comments at 3; WorldCom Comments at 3.

[6] AT&T Comments at 4; WorldCom Comments at 5.

[7] AT&T Comments at 6.

consequences in the model. Commission staff should satisfy itself regarding these concerns before adopting any of these changes.

III. THE COMMISSION SHOULD REJECT THE REMAINING CHANGES PROPOSED BY AT&T AND WORLDCOM

AT&T and WorldCom propose numerous additional changes beyond those discussed above. Most of these remaining changes exceed the scope of the present inquiry. In the *Public Notice*, the Common Carrier Bureau ("Bureau") sought comment on the relative advantages of the Delphi version over the Turbo-Pascal version of the model, as well as recommendations concerning improvements to the Delphi version.[8] The *Public Notice* did not suggest that the Commission would be reconsidering fundamental decisions made in adopting the model platform and its inputs. Nevertheless, that is exactly what AT&T and WorldCom are requesting, in a number of instances rehashing matters already decided by the *Tenth Report and Order*. Moreover, even if they were appropriately considered here, these changes would not be warranted.

A. Use of Actual Geocode Data

AT&T argues that the Commission should use actual geocode, rather than surrogate, customer location data in the model.[9] However, the Commission specifically rejected AT&T's position on this issue in the *Tenth Report and Order*, concluding that no source of actual geocode data had been adequately accessible for public review.[10] Although the Commission stated its expectation that a source of accurate and verifiable actual geocode data would be identified at

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[8] Common Carrier Bureau Seeks Comment on Translation of Cost Model to Delphi Computer Language and Announces Posting of Updated Cost Model, *Public Notice*, CC Docket No. 96-45, DA 01-1458 (Comm. Carr. Bur., rel. June 20, 2001) ("*Public Notice*").

[9] AT&T Comments at 8-11.

[10] *Tenth Report and Order*, 14 FCC Rcd. at 20173-74 ¶ 36.

some point in the future for use in the model, AT&T has not identified such a source. As AT&T acknowledges, the Commission rejected use of the geocode data maintained by TNS Telecoms ("TNS", formerly PNR & Associates), because interested parties had not had a sufficient opportunity to review and comment on the accuracy of that data set.[11] Furthermore, the Commission specifically noted the significant conditions and expense in obtaining geocode data from TNS.[12] These concerns continue today. Just two months ago, Qwest inquired of TNS about obtaining access to its geocode data for purposes of analyzing a version of the HAI model submitted in state unbundled network element cost dockets. TNS responded that Qwest could review the data via a remote terminal for a setup charge of $5,000 and a per-day charge of $4,000, subject to a one-day minimum.[13] Such charges contradict AT&T's claim that the Commission's concerns regarding the accessibility of the TNS data are "outdated."[14] Moreover, there continues to be serious questions whether the use of TNS' geocode data set would necessarily lead to more accurate cost estimates, given that it is much less complete in rural areas than urban areas.

The Commission should also reject AT&T's suggestion that incumbent local exchange carriers ("ILEC") should be required to supply geocode or geocodable customer location information for use in the model.[15] In the *Tenth Report and Order*, the Commission denied a similar suggestion by AT&T and WorldCom.[16] Furthermore, such a requirement could result in

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[11] *Id.* at 20175 ¶ 39.

[12] *Id.*

[13] *See* Attachment A, Letter from Charles A. White, TNS Telecoms, to Peter Copeland, Qwest (June 21, 2001) (via e-mail).

[14] *See* AT&T Comments at 10.

[15] *Id.*

[16] *Tenth Report and Order*, 14 FCC Rcd. at 20175 n.87.

the disclosure of very competitively sensitive information, especially to the extent that the information provided identifies the type and quantity of services provided to particular customers. In addition, while BellSouth has geocoded customer location data for certain state proceedings, it has found this an exceedingly difficult and expensive undertaking. As a result, such an approach should be pursued only after serious consideration and is clearly beyond the scope of the present inquiry.

Finally, while the Joint Commenters do not object to investigation of the way in which the model designs plant for multi-tenant buildings,[17] they do not agree with AT&T's contention that the current methodology necessarily overstates the cost of serving such buildings. To the contrary, preliminary test runs by the Joint Commenters indicate that the model significantly understates the cost of certain outside plant components, such as network interface devices, necessary to serve multi-tenant buildings.

B. Structure Sharing Between Feeder and Distribution Facilities

The Commission must reject AT&T's proposal to modify the model to reflect structure sharing between feeder and distribution facilities.[18] While AT&T's proposal may have superficial appeal, it is not consistent with usual practices in the field. As discussed in the attached testimony of James W. Stegeman originally filed with the Georgia Public Service Commission,[19] feeder and distribution cable typically do not share the same structure.[20] This lack of sharing results from a number of factors. First, feeder and distribution plant are typically

[17] *See* AT&T Comments at 10.

[18] *Id.* at 11.

[19] Attachment B, Rebuttal Testimony of Mr. James W. Stegeman on Behalf of BellSouth Telecommunications, Inc. Before the Georgia Public Service Commission, Docket No. 5825-U, dated Sep. 8, 2000 ("Stegeman Testimony").

[20] *Id.* at 10.

installed at different times, which generally precludes the sharing of trench structure. Second, whereas feeder cable is sometimes placed in an underground conduit, in non-urban areas distribution cable is usually buried or placed on telephone poles for easy access to distribution facilities and less expensive connections to end-user customers.[21] As Mr. Stegeman points out, there would be no cost savings from placing distribution cable in a conduit with feeder cable, if it were necessary to then run the distribution cable back down the street from the manhole in a trench or on poles to serve individual customers, or, alternatively, to increase significantly the number of vaults or manholes along a feeder route.[22] Third, in many instances where aerial distribution plant is placed, the spacing and size of the poles will typically not support the weight of the large copper feeder cables.[23]

The Commission should also reject AT&T's effort to transform the Kansas-specific feeder-distribution sharing input adopted by the Kansas Corporation Commission ("Kansas Commission") into a nationwide input. The basis for the 40 percent reduction in feeder structure and placement costs was highly questionable, even as applied in Kansas.[24] Moreover, there is no

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[21] The Commission has recognized that feeder and distribution cable often utilize different structure by adopting different plant mix ratios for feeder and distribution. *Tenth Report and Order*, 14 FCC Rcd. at 20258-59 ¶¶ 236-40.

[22] Stegeman Testimony at 10.

[23] *Id.* at 11. AT&T's reliance on feeder and distribution structure sharing in the BellSouth model is misplaced. As Mr. Stegeman explains, BellSouth has recognized that its model incorrectly assumed sharing of structure in any instance in which feeder and distribution *shared the same route*. *Id.* at 12-13. It should also be noted that the HAI model supported by AT&T and WorldCom does not assume feeder-distribution sharing of structure.

[24] Sprint, who participated in the Kansas proceeding, strongly disagreed with the decision in that proceeding. As Sprint explained to the Kansas Commission, Sprint's actual buried structure costs, which are higher than the inputs adopted by the Commission, are calculated on a post-sharing basis, including sharing with other entities and any internal cost sharing efficiencies. This means that any internal economies of scale that can be achieved had already been reflected in the base structure cost used by the model. Rebuttal Testimony of John Holmes, *Investigation*

justification for applying such a reduction on a nationwide basis. The Kansas Commission emphasized that the changes it was making to the input values adopted in the *Tenth Report and Order* were being made solely to reflect Kansas-specific conditions.[25] AT&T does not even attempt to explain how the analysis of 14 wire centers in Kansas, even assuming that analysis was correct, can be extrapolated to the thousands of wire centers served by the carriers whose high cost support is determined by the Synthesis Model.[26] As a result, the Commission should summarily reject this proposal.

C. Use of Host/Stand-alone or Remote Switches

The Commission should similarly reject AT&T's suggestion to use some undefined "forward-looking principles," rather than the Local Exchange Routing Guide ("LERG") database, for determining whether a wire center in the model uses a host/stand-alone or remote switch.[27] In the *Tenth Report and Order*, the Commission adopted the use of the LERG, despite AT&T's and WorldCom's objections that such an approach might reflect the use of embedded

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into the Kansas Universal Service Fund (KUSF) Mechanism for the Purpose of Modifying the KUSF and Establishing a Cost-Based Fund, Docket No. 99-GIMT-326-GIT (Nov. 22, 1999).

[25] *Investigation into the Kansas Universal Service Fund (KUSF) Mechanism for the Purpose of Modifying the KUSF and Establishing a Cost-Based Fund,* Docket No. 99-GIMT-326-GIT, Order 16: Determining the Kansas-Specific Inputs to the FCC Cost Proxy Model To Establish a Cost-Based Kansas Universal Service Fund 3 (Kansas Corp. Comm'n 2000) ("In this proceeding, the Commission has adapted the FCC's cost model for Kansas conditions, to ensure that nationally-established values for model variables are modified to fairly reflect relevant distinguishing circumstances in Kansas.").

[26] AT&T's advocacy for a 40 percent reduction in "structure and placement costs in the cost model" is not even supported by the Kansas decision. The Kansas Commission adopted a 40 percent reduction in *feeder* structure and placement to reflect purported sharing in the model between feeder and distribution cable. AT&T's proposal would apply a 40 percent reduction to structure and placement costs for both feeder *and distribution*, thus doubling the impact of such sharing.

[27] AT&T Comments at 12.

technology, pricing, and engineering practices.[28] The Commission found that the LERG was the best source of data available for determining host-remote switch relationships in the model, and particularly more reliable than the approach advocated by AT&T and WorldCom.[29] The Commission emphasized that no other algorithm had been placed on the record to determine whether a wire center should house a stand-alone, host, or remote switch.[30] Nor has AT&T provided such an algorithm with its Comments. The LERG continues to be the best source of data for determining switch relationships. As a result, the Commission should disregard AT&T's proposed change.

D. Structure Sharing Percentages

Once again seeking reconsideration of a decision in the *Tenth Report and Order*, AT&T argues that the Commission should adopt more forward-looking structure sharing percentages.[31] However, AT&T presents no reasonable basis for doing so. If anything, the structure sharing percentages adopted in the *Tenth Report and Order* assumed more sharing than would actually occur in a competitive forward-looking environment. Qwest has examined the fiber optic construction permits for the first half of 2001 for one of the most competitive areas in its in-region territory along 17th Street in downtown Denver. The permit records show that while multiple competitive local exchange carriers installed fiber optic cable along this corridor during this period, some at the same time, sharing did not occur. Clearly the opportunity to share exists, but these carriers did not choose to do so.[32]

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[28] *Tenth Report and Order*, 14 FCC Rcd. at 20292-93 ¶ 322.

[29] *Id.* at 20293 ¶ 323.

[30] *Id.*

[31] AT&T Comments at 14-15.

[32] Even AT&T has recognized that city ordinances requiring structure sharing are problematic and may not work in practice. In the article cited by AT&T regarding cities that have required

The Joint Commenters consider input issues such as structure sharing to be beyond the scope of the present inquiry. However, if the Commission were to consider structure sharing, the evidence would suggest that the *Tenth Report and Order* overestimated the amount of sharing. Furthermore, in adopting the current sharing percentages, the Commission already considered, and factored in, AT&T's and WorldCom's arguments regarding forward-looking practices.[33]

E. Distribution Plant Mix

The Commission should also refuse AT&T's attempt to reargue the estimates for distribution plant mix used in the model. In adopting those percentages, the Commission rejected a number of the assumptions underlying the plant mix percentages proposed by AT&T and WorldCom.[34] The Commission also recognized that the nationwide averages it was adopting would not necessarily reflect the percentage of plant types deployed by particular companies.[35] Thus, the fact that BellSouth may have reported plant mix percentages that are different than those used in the model is not a reasonable basis for modifying these inputs, even if this issue were properly within the scope of the current inquiry, which it is not.

F. Prices for Underground Cable

The Commission also should reject AT&T's effort to revise the price estimates in the model for underground cable. This represents merely another instance of AT&T rehashing

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structure sharing (AT&T Comments at 14 n. 21), carriers expressed concern over such policies because "the odds that all interested carriers will agree on the exact location of a trench are slim, since most extend fiber when customers order it." *Can You Dig It?*, Interactive Week, at 2 (Feb. 14, 2001). According to AT&T spokesman Dave Johnson, to lay fiber in a city's designated area, just in case it might be needed in the future, is "inefficient business." *Id.*

[33] *Tenth Report and Order*, 14 FCC Rcd. at 20262 ¶ 247. The percentages adopted by the Commission were significantly more aggressive than the percentages generally advocated by ILECs. *Id.*

[34] *Id.* at 20258-59 ¶¶ 237-38.

[35] *Id.* at 20259 ¶ 238.

arguments that the Commission rejected in the *Tenth Report and Order*. The Commission need not, and should not, consider this settled issue again.

G. Updated Prices for Digital Loop Carrier Equipment

The Commission should similarly ignore AT&T's effort to revive its proposed price estimates for digital loop carrier ("DLC") equipment, which the Commission rejected in the *Tenth Report and Order*.[36] In that *Order*, the Commission disagreed with AT&T's and WorldCom's analysis of the contract data used to derive the DLC price estimates adopted by the Commission.[37] AT&T has presented no new evidence to undermine the Commission's decision in the *Tenth Report and Order*.

H. Distribution of Residual Lines

The Joint Commenters disagree with AT&T's proposed change to address the issue of "residual lines," which arises from the model's use of fractional line counts. As discussed in the Stegeman Testimony, while the suggested fix may address the residual line issue raised by AT&T and WorldCom, there is no attempt to preserve data points.[38] If the line correction value in the HCPM is negative, then it is possible that microgrids with single lines will be inappropriately removed. Verizon (formerly GTE) has also identified problems with AT&T's proposed solution, and has provided a more appropriate alternative.[39]

I. Determination of Cable Routes

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[36] *Id.* at 20275-76 ¶¶ 278-81.

[37] *Id.*

[38] Stegeman Testimony at 8.

[39] *See* Letter from W. Scott Randolph, GTE, to Magalie Roman-Salas, FCC, at 2-3, dated Apr. 14, 2000 ("*GTE Letter*").

The Commission should also decline to adopt AT&T's and WorldCom's suggestion to use distance criteria, not cost criteria, to determine cable routes.[40] Implementing this change, without recognizing the routing that must occur in the network, may lead to no better an estimate of costs than through use of the current algorithm.[41]

J. Overlapping Microgrids

The Commission should reject AT&T's proposed change to address overlapping microgrids.[42] As pointed out by Verizon, AT&T's proposed solution would introduce problems that are far worse than the issue that it tries to remedy.[43]

The long list of proposed changes discussed above sharply contrasts with the three implementation errors that the Joint Commenters identified in their initial Comments. Specifically, the Joint Commenters suggested that the Commission should eliminate the inconsistency in the computation of special access lines in the HCPM and HAI portions of the model;[44] fix the model's sizing of serving area interfaces;[45] and address the inconsistency caused by updating line count data without also updating road data and customer location data used in the model.[46] All three changes are necessary to ensure that the model operates as intended and therefore should be implemented before using the model to determine universal service support for non-rural carriers for 2002.

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[40] AT&T Comments at 6-7; WorldCom Comments at 4.

[41] Stegeman Testimony at 9.

[42] *See* AT&T Comments at 7-8. *See also* WorldCom Comments at 2-3.

[43] *GTE Letter* at 1-2.

[44] Joint Comments at 7.

[45] *Id.* at 8-9. In fact, AT&T and WorldCom both recognize that the model uses some outside plant equipment that is too small and thereby understates costs. *See* AT&T Comments at 4; WorldCom Comments at 5.

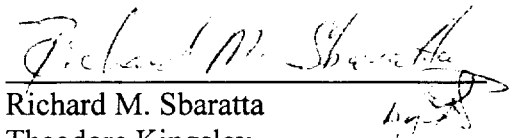
[46] Joint Comments at 10.

IV. CONCLUSION

For the reasons discussed above and in the Joint Comments, the Commission should adopt the positions advocated by the Joint Commenters.

Respectfully submitted,

BELLSOUTH CORPORATION



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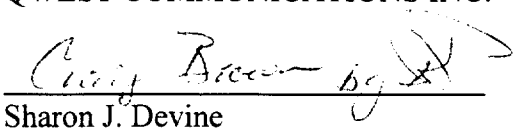

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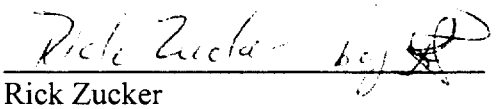

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August 27, 2001

ATTACHMENT A

REBUTTAL TESTIMONY OF MR. JAMES W. STEGEMAN
ON BEHALF OF BELLSOUTH TELECOMMUNICATIONS, INC.
BEFORE THE GEORGIA PUBLIC SERVICE COMMISSION
DOCKET NO. 5825-U
September 8, 2000

INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS AFFILIATION.

A. My name is James W. Stegeman. I am the President of CostQuest Associates, Inc. I am testifying on behalf of BellSouth Telecommunications ("BST", "BellSouth", or the "Company").

Q. ARE YOU THE SAME JAMES W. STEGEMAN WHO FILED DIRECT TESTIMONY IN THE PROCEEDING ON AUGUST 1, 2000?

A. Yes. In that testimony I described my relevant training, experience, and education.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to address the HCPM modifications proposed as part of the direct testimony of Mr. John C. Donovan and Mr. Brian F. Pitkin

(testifying on behalf of AT&T and WorldCom). Daonne Caldwell will address the specific values for the input changes recommended by Mr.Donovan and Mr. Pitkin. For convenience, I will sometimes refer to Mr. Donovan and Mr. Pitkin as "D&P".

Q. D&P SPEND A GREAT DEAL OF TIME DISCUSSING "CORRECTIONS" TO THE SYNTHESIS MODEL. ARE YOU SURPRISED BY THE NUMBER AND IMPACT OF THE CHANGES

A. Yes. It is difficult to believe that the FCC's HCPM model overstates the subsidy requirements of Georgia by over 50% as suggested by D&P. This is a national model being used by many states and by the FCC for determining the required level of universal service funding. It would seem that if the model's costs were as overstated as suggested by D&P that the FCC would implement fixes as quickly as possible. However, this is not the case. At page 13, D&P note that their proposed changes were discussed with the FCC Staff in February. The FCC, however, has not implemented any of these changes. Indeed, in checking with the staff of the FCC, they have not yet even determined whether any of the changes should be implemented.

In my direct testimony of August 1, I discussed five key limitations of the SM. My discussion was designed in part to suggest that in the future, certain changes should be considered to the SM. My discussion of these limitations

was also intended to stress caution in making changes to inputs or changes to source code that could lead to inconsistencies with other parts of the model. I also suggested that a benefit of the model is that it could be a standard platform that could allow parties to focus attention to setting inputs correctly rather than arguing the methods of the model. Under my approach, only inputs were modified to address limitations. D&P has taken a different approach and testified that the code of the model should be modified now. First, this leads to questions such as, who will implement, test and verify the code changes? Once the code is modified, who will maintain the Georgia model?

More importantly, their proposal represents a fundamentally different approach to the model. I have proposed to generally accept the model (for now, at least) without code changes. I did address some model issues with input changes, but I otherwise accepted the FCC's version of the model as a starting point. I still believe that this is an appropriate approach. However, if the Commission is inclined to consider modifying the model code more drastically, as advocated by D&P, then it is extremely important to be certain that ***all*** appropriate modifications are made. While D&P have offered some modifications that I will discuss below, there are several important modifications which they have failed to mention. I will discuss these below, as well.

Q. CAN YOU EXPAND ON YOUR CONCERN ABOUT CODE MODIFICATIONS?

A. The short span of time allowed for studying the D&P modifications hardly allows enough time for unit testing let alone understanding the implications of the code change at a statewide level.

For example, a code change may appear logically correct within the confines of a particular unit or module. However, within the scope of our testing, we have little certainty that any particular "small" change will have an impact limited only to this one area. D&P propose a change to the node attachment algorithm. Within the set of input values modified for this proceeding, the code modifications might appear to operate correctly. If a new set of input values is later tested, it is quite conceivable that the model, with this modified attachment algorithm, may not work or may calculate incorrectly. One of the most significant disadvantages to any code modification, at this point, is that it will create a model unique to this one proceeding and set of inputs. The benefit of the Synthesis Model's stability and public scrutiny is therefore eliminated.

Q. HAVE YOU BEEN ABLE TO VERIFY WHETHER D&P'S SUGGESTED CODE CHANGES ARE INDEED CORRECT?

A. Given that my team has had only a few weeks to open up the HCPM code and investigate the proposed modifications, it has been difficult to verify each and every change and the interaction of the changes with other portions of the model. It does appear that some of the errors pointed out by D&P are valid (some with modifications). Yet, a few are inappropriate. On balance, I am concerned that the FCC has not responded to these recommendations. And, I am concerned that, while D&P may be fixing piece parts of a model that abstracts the customer locations and the rectilinear routes needed to connect these customers, the modified model may be getting no closer to the real cost of providing service to actual customer locations following routes constrained by rights-of-way. Even if one assumes that modifications are indeed valid, the changes need to be addressed in concert with all other noted model shortcomings and in the context of real locations and routing. I noted some of these shortcomings in my direct testimony.

Q. CAN YOU PROVIDE COMMENTS ON YOUR REVIEW OF THE HCPM AND D&P'S SUGGESTED CHANGES?

A. Yes. In the paragraphs to follow, I will review each of D&P suggested changes. I will also expand on some of my previously noted shortcomings of the HCPM and on other deficiencies of the model that were discovered in our limited code review. Finally, I will review the appropriate road multiplier factor that is intended to provide a result closer to reality.

Q. PLEASE REVIEW YOUR FINDINGS ON D&P'S ITEM 1: DROP TERMINAL DISPERSION.

A. While the suggested fix appears correct in regard to this section of the HCPM, the code provided by D&P would not compile. We had to modify line 533. We assumed that the extra special characters were clerical errors rather than a term missing from the statement.

D&P Code

```
y^[n]:=GR^.LowerLeftY + (row-1)*GR^.MicroGridNS+j*()*GR^.MicroGridNS /NS)lots);
```

Modified Code

```
y^[n]:=GR^.LowerLeftY + (row-1)*GR^.MicroGridNS+j*(GR^.MicroGridNS /NS)lots);
```

Q. PLEASE REVIEW YOUR FINDINGS ON D&P'S ITEM 2: DROP TERMINAL ORIENTATION.

A. While the suggested fix appears correct in regard to this section of the HCPM, it is not clear whether the fix for this issue should also incorporate Item 1 (Item 1 and 2 affect the same section of code). In D&P's proposed code, Item 2 does not include the fixes listed in Item 1. In other words, as the change is implemented it would seem to re-create the problem addressed in Item 1.

Q. PLEASE REVIEW YOUR FINDINGS ON D&P'S ITEM 3: LOT SIZE / CONFIGURATION.

A. The suggested fix appears correct in regard to this section of the HCPM. However, we could not replicate the level of change. When we implemented the code provided by D&P, the distribution route distance increases over 1.5%, not the 0.4% noted by D&P.

Q. PLEASE REVIEW YOUR FINDINGS ON D&P'S ITEM 4: INPUT VARIABLES.

A. The suggested fixes to the Globals.pas and Structur.pas appear correct in regard to this section of the HCPM. However, I do not believe the suggested code fixes for Terminal.pas and Tech.pas are complete. Tech.pas does not size the FDI for the correct Distribution and Feeder cable sizes. Similar to the problem noted by D&P in line 146, the lookup for the correct cables sizes should increment in the same manner. As the code stands now, cable sizes used to size the FDI are insufficient for the actual demand. I have attached the suggested code change in Exhibit JWS-1. The Terminal.pas code would be correct if the Drop terminal input table were constructed correctly. The lookup value from the HCPM is the number of distribution pairs. The Drop terminal inputs for sizes 25 and under refer to the number of distribution pairs that can be connected. However, the Drop terminal sizes above 25 refer to the

distribution and feeder pairs that are connected (commonly referred to as the "in" and "out" pairs). While it would be possible to correct the Input table, I am concerned that the user will be confused as to which size cable a price should be associated with. Instead, we instituted a code change that recognizes both the "in" and "out" pairs for Drop terminals above a 25 pair terminal size. The modified code is provided in Exhibit JWS-2.

Q. PLEASE REVIEW YOUR FINDINGS ON D&P'S ITEM 5: RESIDUAL LINE ALLOCATION.

A. While the suggested fix appears to address the residual line problem, there is no attempt to preserve data points. If the line correction value in the HCPM is negative, then it is possible that microgrids with single lines will be removed using D&P's code. If these data points actually represent customers, then they should not be discarded. Typically, these single customer microgrids are the "long haul" customers that incur higher costs. We have modified the code so that, if possible, no microgrids are discarded. The modified code is provided in Exhibit JWS-3.

Q. PLEASE REVIEW YOUR FINDINGS ON D&P'S ITEM 6: NODE SELECTION CRITERIA.

A. While I agree that D&P's minimization of distance seems to create a lower cost network (based on current inputs), I am concerned that implementing this change, without recognizing the routing that must occur in the network, may lead to a result no closer to the correct costs. I will address the issue of the need for a route adjustment factor later in this testimony.

Q. PLEASE REVIEW YOUR FINDINGS ON D&P'S ITEM 7: OVERLAPPING MICROGRIDS.

A. The suggested fix appears correct in regard to this section of the HCPM.

Q. PLEASE REVIEW YOUR FINDINGS ON D&P'S ITEM 8: DISTRIBUTION / FEEDER SHARING.

A. I do not agree with the arguments made by D&P in regards to feeder and distribution structure sharing. I also disagree with the suggested adjustment to the road multiplier factor.

Q. AT PAGE 21, D&P DISCUSS THE POTENTIAL FOR FEEDER AND DISTRIBUTION CABLE TO SHARE THE SAME STRUCTURE. BASED ON YOUR KNOWLEDGE, DO FEEDER AND DISTRIBUTION CABLE ALWAYS SHARE THE SAME STRUCTURE IF THEY SHARE THE SAME ROUTE?